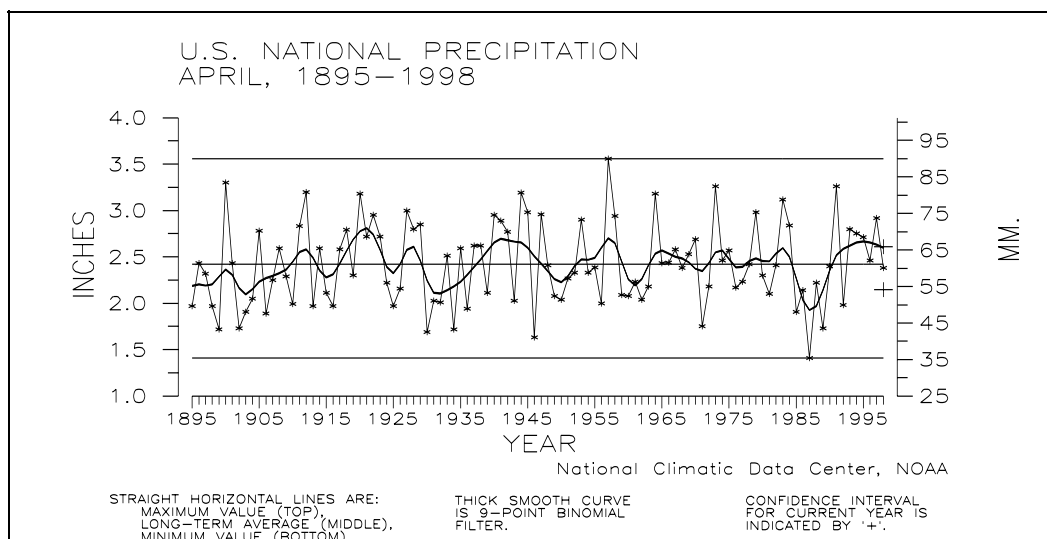
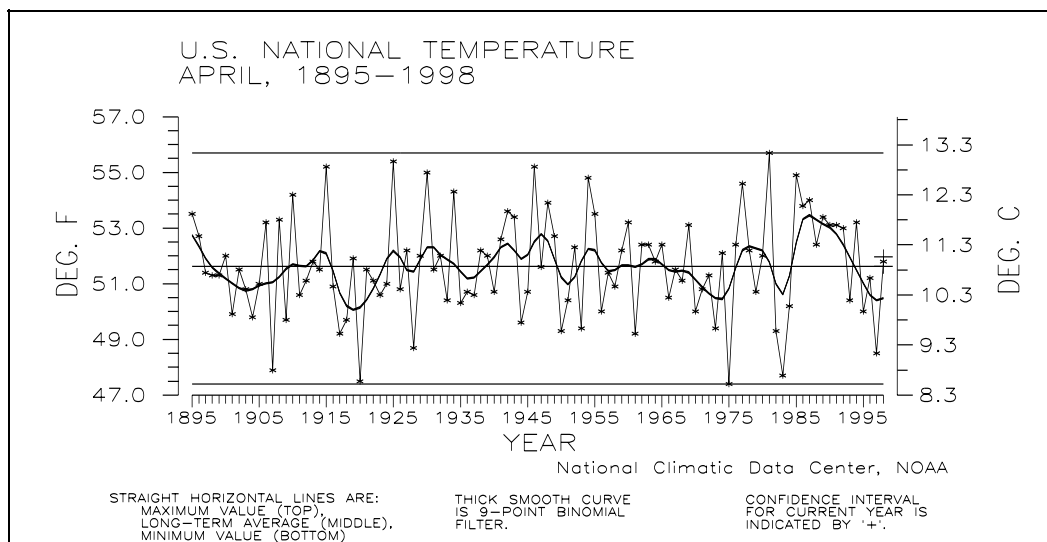


CLIMATE VARIATIONS BULLETIN



This CLIMATE VARIATIONS BULLETIN (CVB) is a preliminary report that puts current monthly climate anomalies into historical perspective using climate databases archived at the National Climatic Data Center (NCDC). It is issued on a monthly basis. Supplemental sections are included which address seasonal and annual perspectives, when appropriate.

Current data are based on preliminary reports from River Forecast Center stations and First and Second Order airport stations obtained from the National Weather Service (NWS) Climate Prediction Center (formerly, Climate Analysis Center), and preliminary tornado statistics obtained from the NWS National Severe Storms Forecast Center. **THE CURRENT DATA SHOULD BE USED WITH CAUTION.** These preliminary data are useful for estimating how current anomalies compare to the historical record, however the actual values and rankings for the current year will change as the final data arrive at NCDC and are processed.

The following NCDC datasets are used for the historical data: the climate division drought database (TD-9640), the hurricane datasets (TD-9636 and TD-9697), the tornado dataset (STORM DATA), and the monthly station dataset (LCD supplemental files). It should be noted that the climate division drought database consists of monthly data for 344 climate divisions in the contiguous United States. These divisional values are calculated from the 6000+ station Cooperative Observer network.

If you are a climate researcher and would like to order copies of the historical datasets used to make graphs of the type in this report, call 828-271-4994 or fax a letter to 828-271-4876 or mail a letter to the address given below, ATTN: Research User Services.

All other questions or requests for data should be made by calling 828-271-4800 or sending a fax to 828-271-4876 or by writing to:

National Climatic Data Center, NOAA
Federal Building
151 Patton Avenue, Room 120
Asheville, NC 28801-5001

If you use any of the information from this CVB, please identify "National Climatic Data Center, NOAA" as the source.

UNITED STATES APRIL CLIMATE IN HISTORICAL PERSPECTIVE

William O. Brown
Alan Basist
National Climatic Data Center, NOAA
Global Climate Lab
Federal Building
Asheville, NC 28801 USA

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El Nino: Analog Years Regional Departures

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TABLE 1. PRECIPITATION AND TEMPERATURE RANKS, BASED
ON THE PERIOD 1895-1998. 1 = DRIEST/COLDEST,
104 = WETTEST/WARMEST FOR APRIL 1998,
104 = WETTEST/WARMEST FOR MAR-APR 1998,
103 = WETTEST/WARMEST FOR NOV 1997-APR 1998,
103 = WETTEST/WARMEST FOR MAY 1997-APR 1998.

REGION	APR 1998	MAR-APR 1998	NOV 1997- APR 1998	MAY 1997- APR 1998
-----	----	-----	-----	-----
PRECIPITATION:				
NORTHEAST	64	60	94	69
EAST NORTH CENTRAL	26	81	62	53
CENTRAL	82	81	65	60
SOUTHEAST	82	93	103	103
WEST NORTH CENTRAL	47	67	33	70
SOUTH	15	44	81	82
SOUTHWEST	60	74	83	93
NORTHWEST	25	36	35	73
WEST	84	82	100	101
NATIONAL	50	79	99	98
TEMPERATURE:				
NORTHEAST	83	93	102	85
EAST NORTH CENTRAL	92	88	102	97
CENTRAL	59	65	92	54
SOUTHEAST	53	39	46	21
WEST NORTH CENTRAL	85	66	97	96
SOUTH	30	25	52	34
SOUTHWEST	17	27	52	74
NORTHWEST	59	79	95	96
WEST	20	36	61	82
NATIONAL	56	54	97	89

TABLE 2. EXTREMES, 1961-90 NORMALS, AND 1998 VALUES FOR APRIL. IT SHOULD BE NOTED THAT THE 1998 VALUES WILL CHANGE WHEN THE FINAL DATA ARE PROCESSED.

REGION	PRECIPITATION (INCHES)				NORMAL PCPN	1998 PCPN
	DRIEST VALUE	YEAR	WETTEST VALUE	YEAR		
NORTHEAST	1.40	1896	6.81	1983	3.42	3.58
EAST NORTH CENTRAL	1.04	1946	4.84	1896	2.63	1.97
CENTRAL	1.55	1915	6.82	1927	3.95	5.02
SOUTHEAST	.85	1986	7.06	1928	3.52	4.79
WEST NORTH CENTRAL	.48	1926	2.83	1984	1.62	1.43
SOUTH	1.08	1987	6.92	1957	2.98	2.11
SOUTHWEST	.26	1989	2.58	1900	.83	.93
NORTHWEST	.61	1977	3.81	1937	1.97	1.37
WEST	.14	1909	3.25	1967	1.22	1.71
NATIONAL	1.41	1987	3.56	1957	2.38	2.38*

* PRELIMINARY VALUE, CONFIDENCE
INTERVAL + OR - .23 INCHES

REGION	TEMPERATURE (DEGREES F)				NORMAL TEMP	1998 TEMP
	COLDEST VALUE	YEAR	WARMEST VALUE	YEAR		
NORTHEAST	38.8	1943	50.4	1921	44.4	46.8
EAST NORTH CENTRAL	35.7	1950	51.8	1915	44.0	47.8
CENTRAL	45.4	1907	59.5	1896	53.4	53.4
SOUTHEAST	56.6	1901	66.6	1954	62.1	62.1
WEST NORTH CENTRAL	34.5	1920	49.5	1915	43.0	45.6
SOUTH	57.2	1983	67.4	1925	62.7	60.9
SOUTHWEST	44.4	1920	55.6	1989	49.9	47.5
NORTHWEST	39.7	1975	52.6	1934	44.9	46.0
WEST	43.3	1967	58.5	1934	51.9	50.2
NATIONAL	47.4	1975	55.7	1981	51.7	51.8*

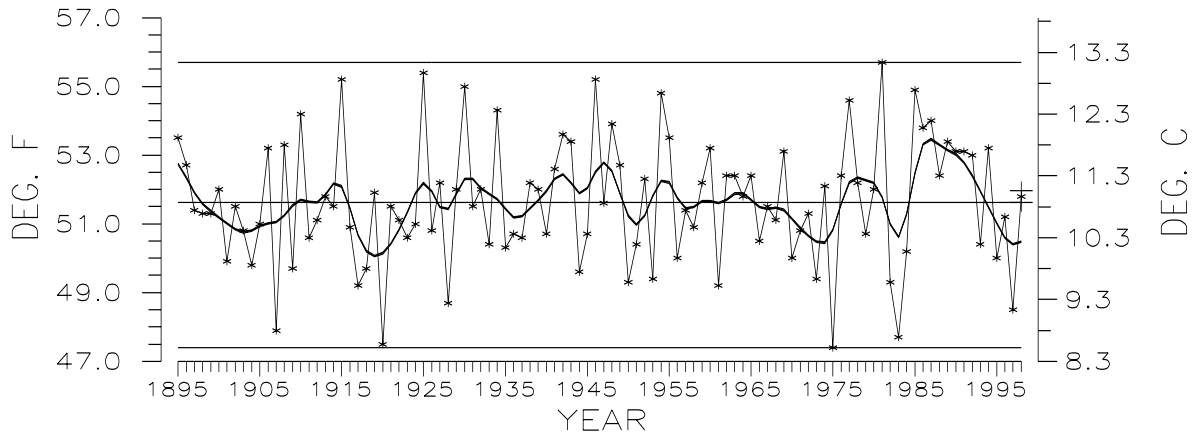
* PRELIMINARY VALUE, CONFIDENCE
INTERVAL + OR - .2 DEG. F.

TABLE 3.

STATISTICS FOR SELECTED RIVER BASINS: PRECIPITATION RANKING FOR OCT-APR 1997-98, WHERE RANK OF 1 = DRIEST, 103 = WETTEST, BASED ON THE PERIOD 1895 TO 1998, AREAL PERCENT OF THE BASIN EXPERIENCING SEVERE OR EXTREME LONG-TERM (PALMER) DROUGHT, AND AREAL PERCENT OF THE BASIN EXPERIENCING SEVERE OR EXTREME LONG-TERM (PALMER) WET CONDITIONS, AS OF APRIL 1998.
RIVER BASIN REGIONS AS DEFINED BY THE U.S. WATER RESOURCES COUNCIL.

RIVER BASIN -----	PRECIPITATION RANK -----	% AREA DRY -----	% AREA WET -----
MISSOURI BASIN	87	.0%	23.9%
PACIFIC NORTHWEST BASIN	47	.0%	9.9%
CALIFORNIA RIVER BASIN	100	.0%	95.8%
GREAT BASIN	83	.0%	33.9%
UPPER COLORADO BASIN	35	.0%	51.4%
LOWER COLORADO BASIN	82	.0%	19.4%
RIO GRANDE BASIN	68	.0%	8.8%
ARKANSAS-WHITE-RED BASIN	96	.0%	56.3%
TEXAS GULF COAST BASIN	82	.0%	29.7%
SOURIS-RED-RAINY BASIN	72	.0%	14.7%
UPPER MISSISSIPPI BASIN	79	.0%	.0%
LOWER MISSISSIPPI BASIN	74	.0%	.0%
GREAT LAKES BASIN	51	.0%	4.7%
OHIO RIVER BASIN	44	.0%	2.3%
TENNESSEE RIVER BASIN	68	.0%	29.4%
NEW ENGLAND BASIN	58	.0%	7.7%
MID-ATLANTIC BASIN	99	.0%	42.4%
SOUTH ATLANTIC-GULF BASIN	103	.0%	76.0%

U.S. NATIONAL TEMPERATURE APRIL, 1895-1998



National Climatic Data Center, NOAA

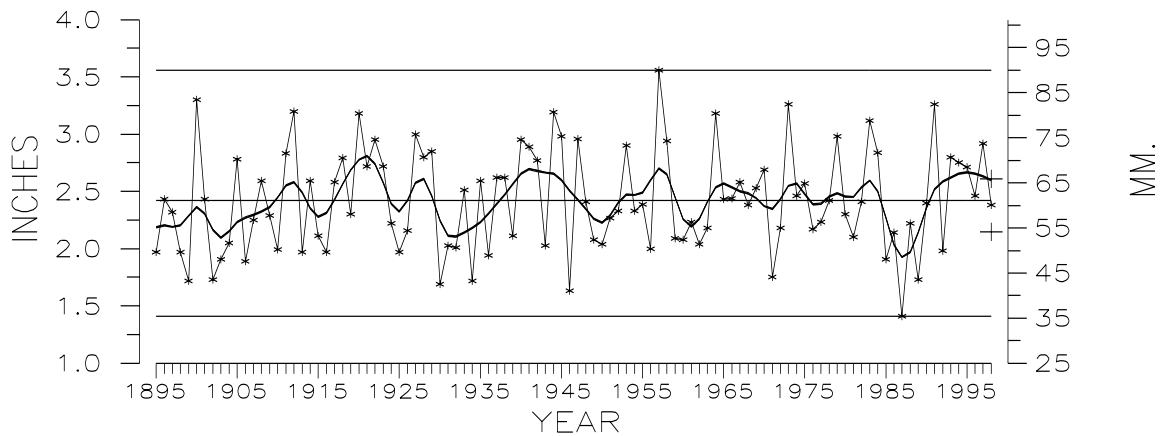
STRAIGHT HORIZONTAL LINES ARE:
MAXIMUM VALUE (TOP),
LONG-TERM AVERAGE (MIDDLE),
MINIMUM VALUE (BOTTOM)

THICK SMOOTH CURVE
IS 9-POINT BINOMIAL
FILTER.

CONFIDENCE INTERVAL
FOR CURRENT YEAR IS
INDICATED BY '+'.
+

Figure 1: Preliminary data for April 1998 indicate that temperature averaged across the contiguous United States was at the long-term mean ranking as the 49th warmest April since 1895. Seven percent of the country was much warmer than normal while slightly more than two percent of the country was much cooler than normal.

U.S. NATIONAL PRECIPITATION APRIL, 1895-1998



National Climatic Data Center, NOAA

STRAIGHT HORIZONTAL LINES ARE:
MAXIMUM VALUE (TOP),
LONG-TERM AVERAGE (MIDDLE),
MINIMUM VALUE (BOTTOM)

THICK SMOOTH CURVE
IS 9-POINT BINOMIAL
FILTER.

CONFIDENCE INTERVAL
FOR CURRENT YEAR IS
INDICATED BY '+'.
+

Figure 2: Preliminary precipitation data indicate that April 1998 was the 50th driest such month since 1895. Over six percent of the country experienced much drier than normal conditions while about six percent of the country was much wetter than normal.

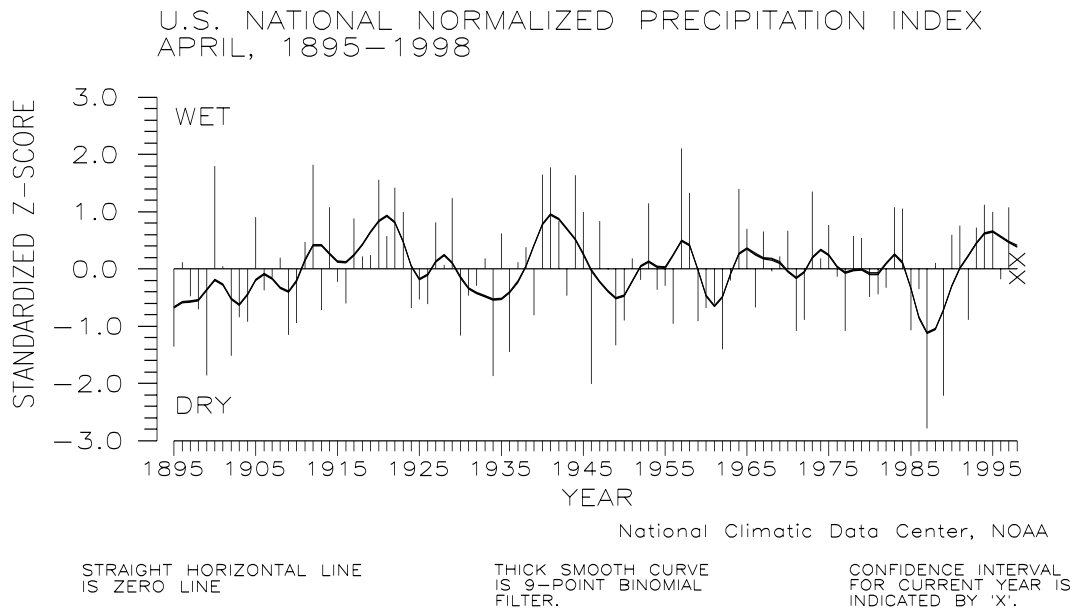


Figure 3: The preliminary national standardized precipitation index ranked April 1998 as the 52nd wettest such month on record. This standardized z-score is estimated to be accurate to within 0.156 index units and its confidence interval is shown as an 'X'.

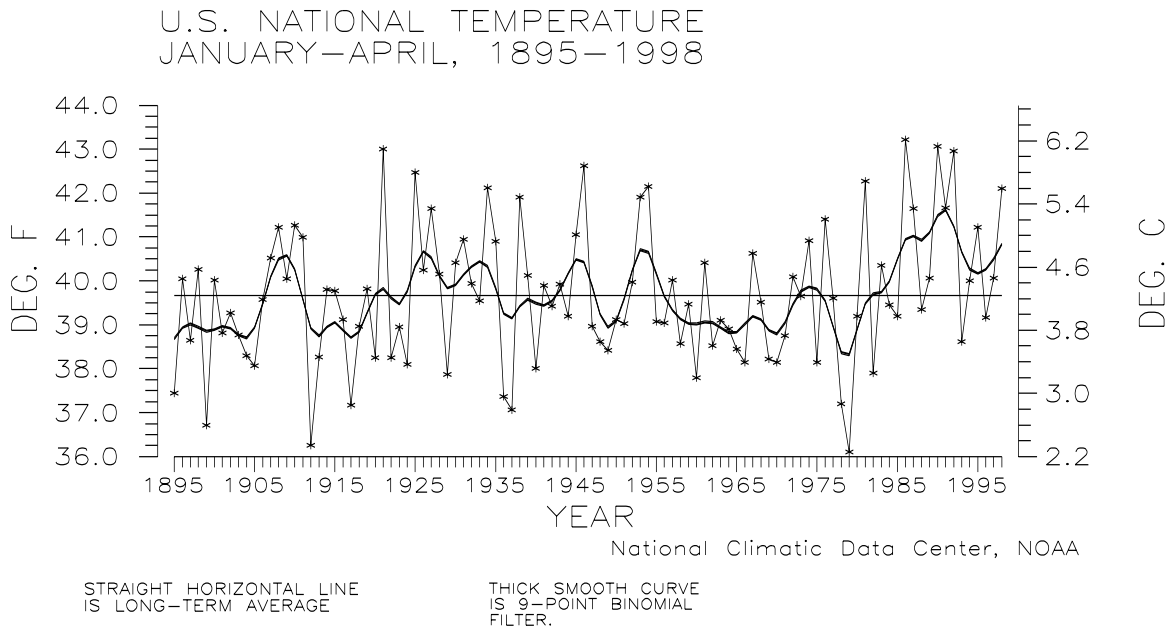


Figure 4: Based upon preliminary data, January-April 1998 was the tenth warmest such period on record. Twenty-six percent of the country had much warmer than normal January-April temperatures while none of the country was much cooler than normal.

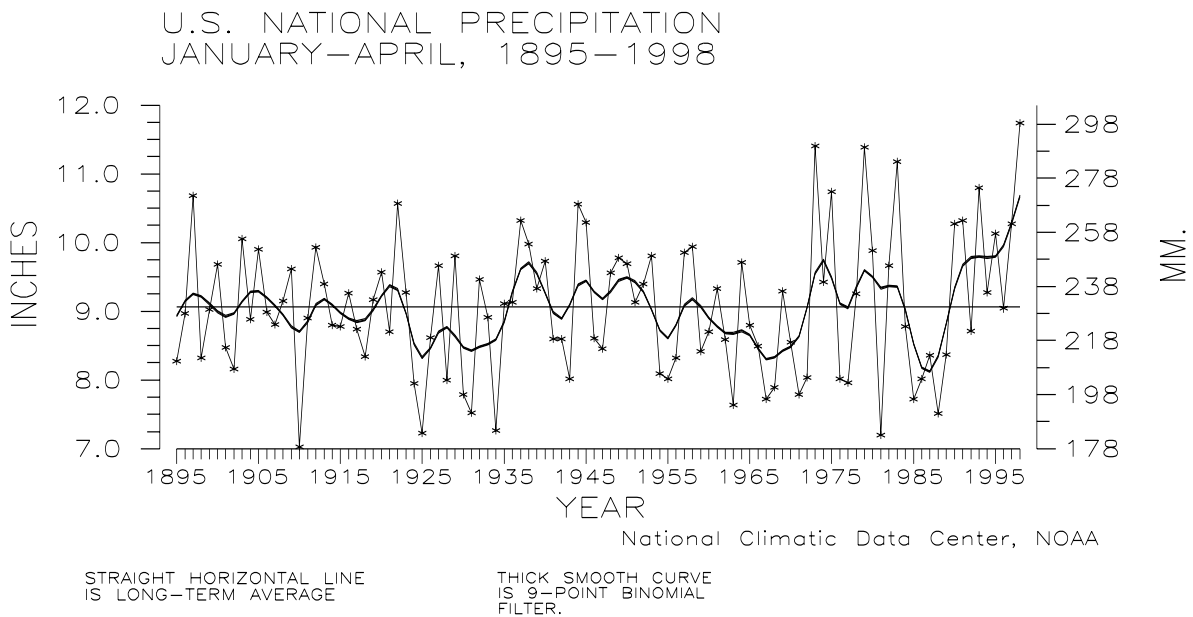


Figure 5: Preliminary precipitation data indicate that the year-to-date, January-April 1998, was the wettest such four-month period since records began. About 34% of the country was much wetter than normal while none of the country was much drier than normal.

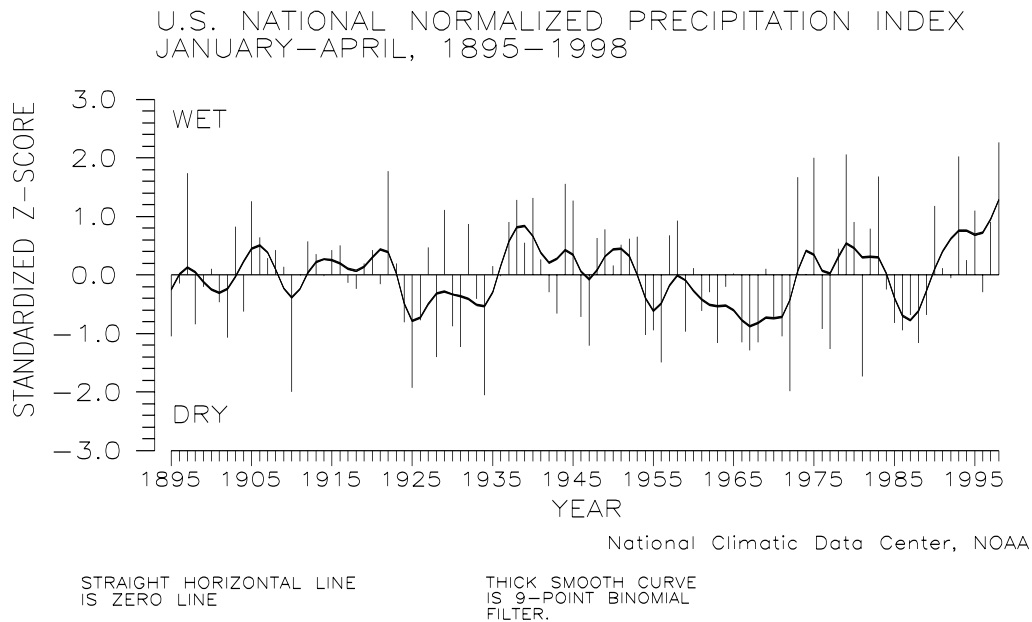


Figure 6: The preliminary national year-to-date standardized precipitation index ranked January-April 1998 as the wettest such period since 1895.

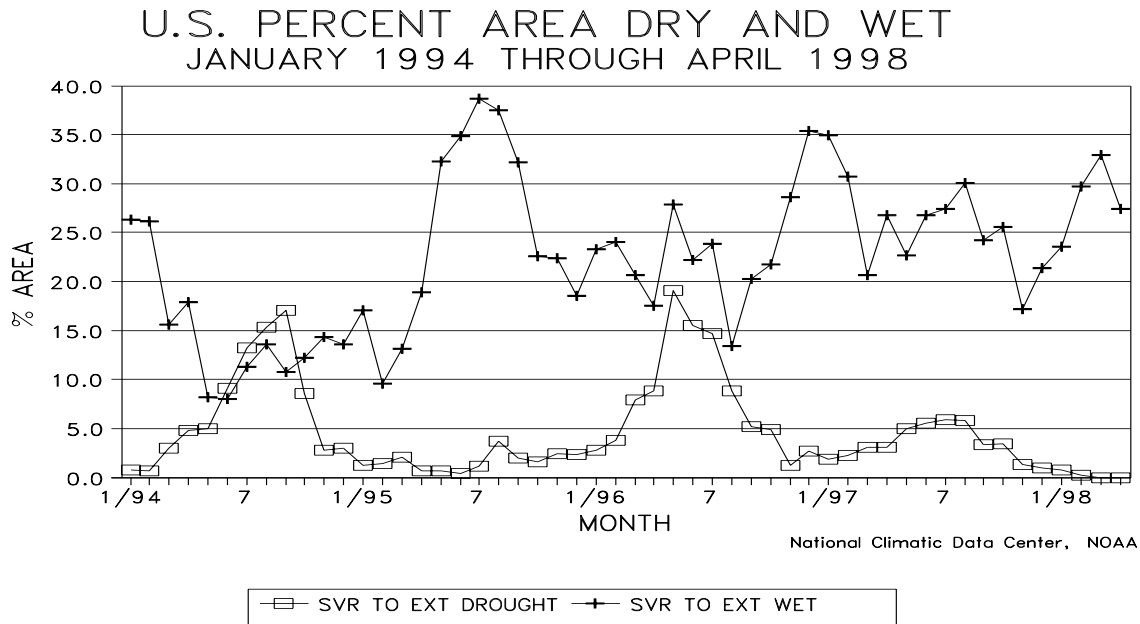


Figure 7: Long-term drought coverage (as measured by the Palmer Drought Index) remained nearly steady during April 1998 with none of the country experiencing severe to extreme drought and greater than 27% of the country experiencing severe to extreme wetness by the end of the month. Core wet areas included California, the central and southern Plains, the Southeast, and portions of the Rockies.

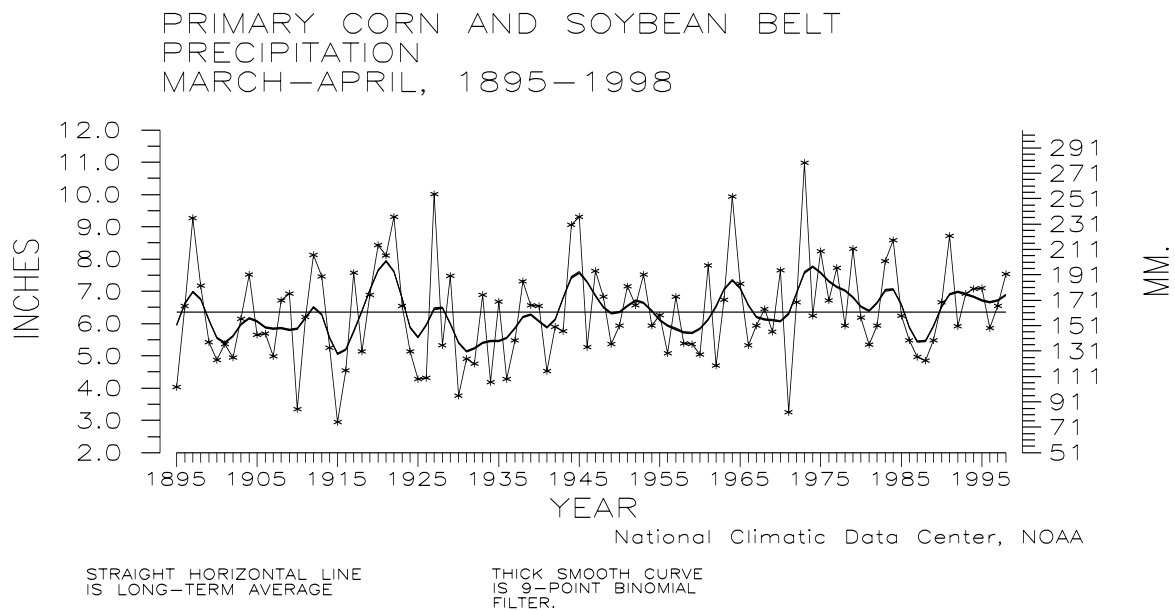


Figure 8: Precipitation for the two-month period, March and April, was slightly above normal in the areas that make up the Primary Corn and Soybean Belt.

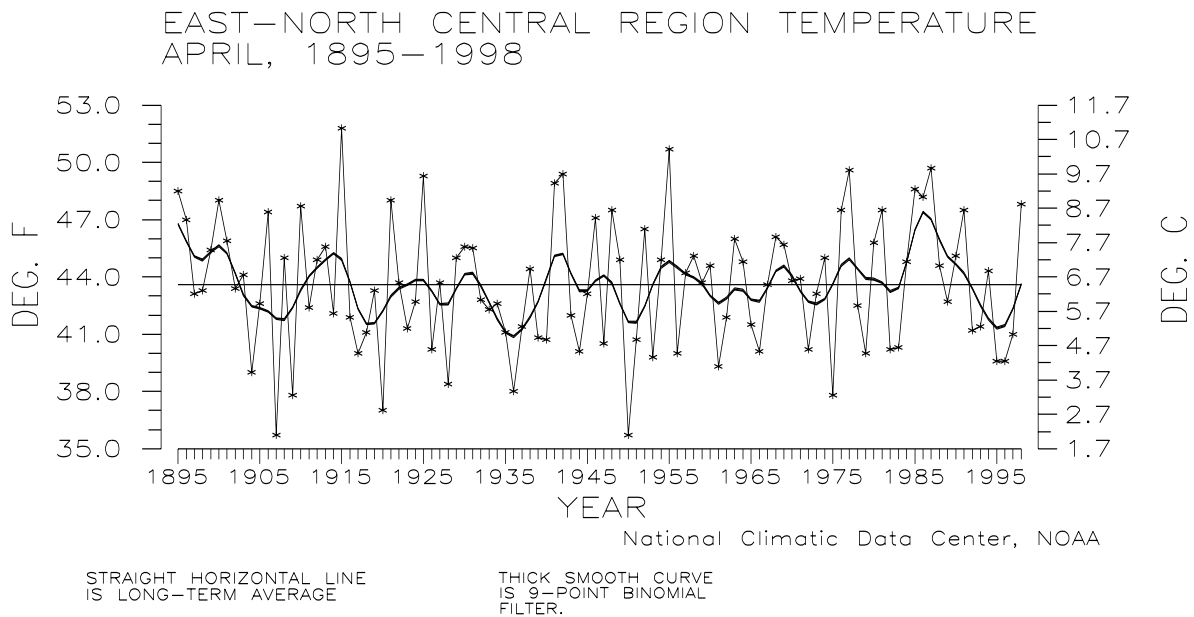


Figure 9: Based upon preliminary data, April 1998 was the 13th warmest such month since 1895 for the East-North Central Region. This region includes Iowa, Michigan, Minnesota, and Wisconsin.

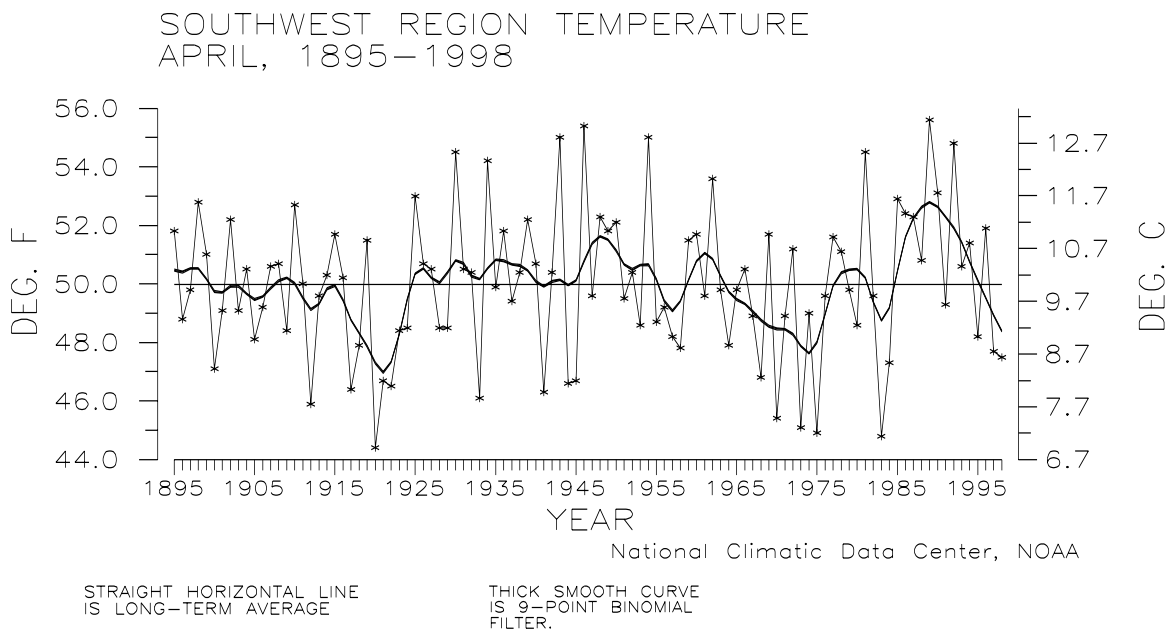
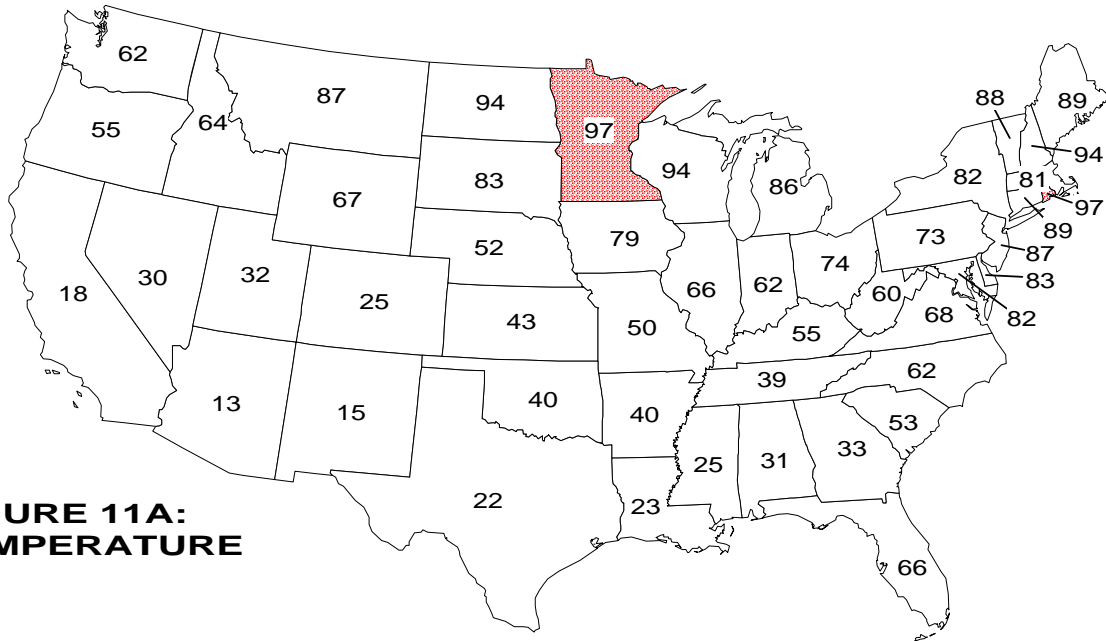
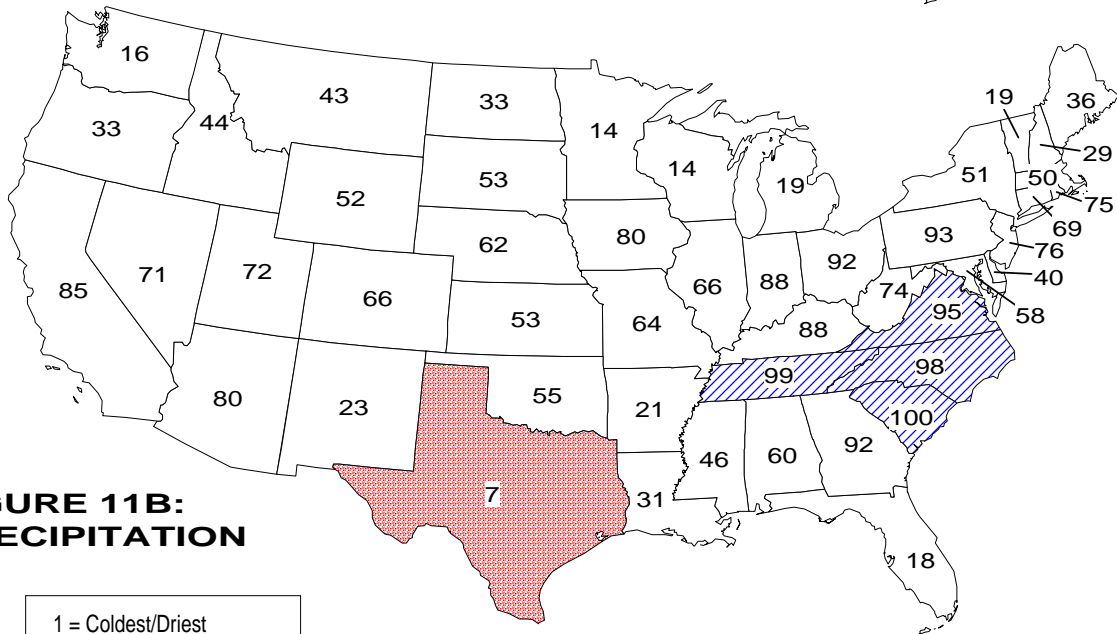


Figure 10: Based upon preliminary data, April 1998 was the 17th coolest such period on record for the Southwest Region. This region includes Arizona, Colorado, New Mexico, and Utah.

APRIL 1998 STATEWIDE RANKS



**FIGURE 11A:
TEMPERATURE**



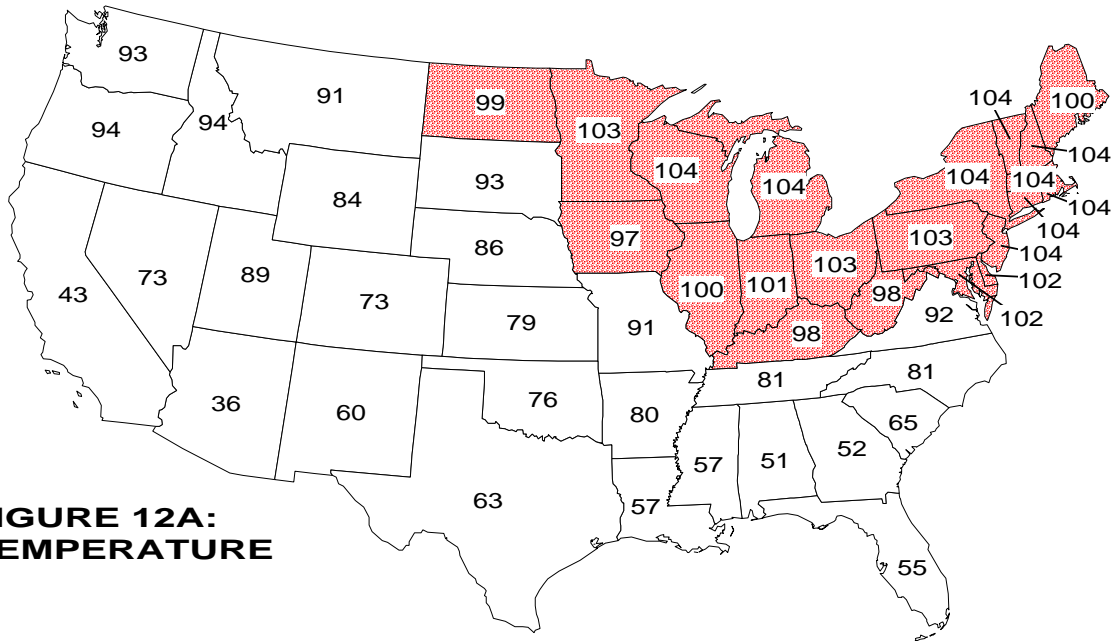
**FIGURE 11B:
PRECIPITATION**

1 = Coldest/Driest
104 = Warmest/Wettest

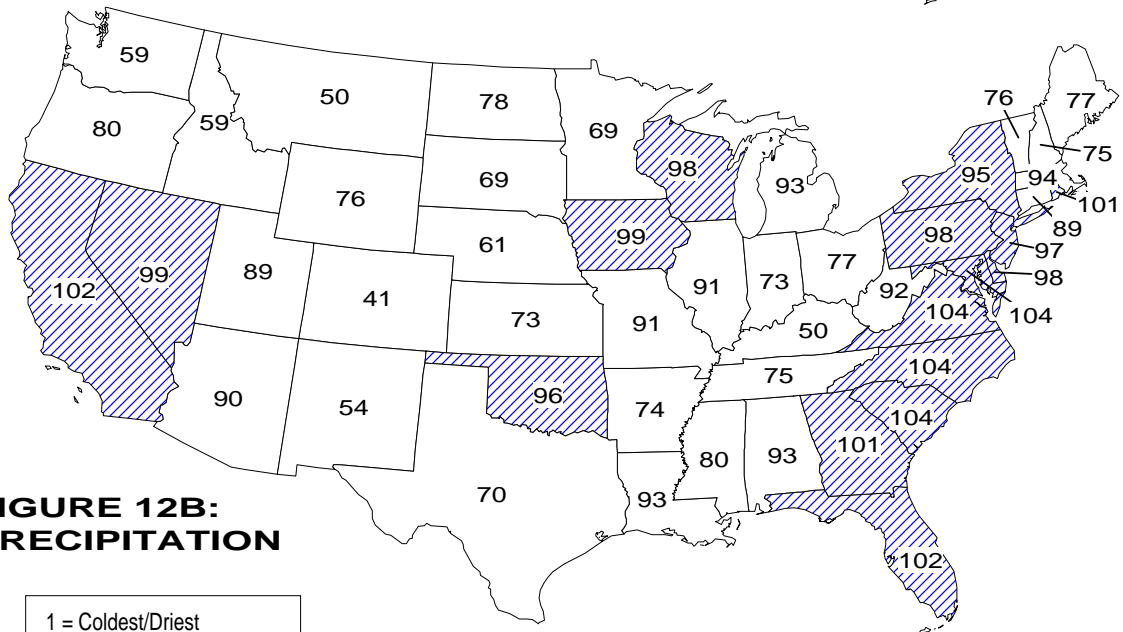
National Climatic Data Center, NOAA

Temperature and Precipitation Ranks for the contiguous United States. Each state is ranked based on its data from 1895-1998. States having a rank of top ten coldest or driest (rank 1-10) or top ten warmest or wettest (rank 95-104) are shaded.

JAN-APR 1998 STATEWIDE RANKS



**FIGURE 12A:
TEMPERATURE**



**FIGURE 12B:
PRECIPITATION**

1 = Coldest/Driest
104 = Warmest/Wettest

National Climatic Data Center, NOAA

Temperature and Precipitation Ranks for the contiguous United States. Each state is ranked based on its data from 1895-1998. States having a rank of top ten coldest or driest (rank 1-10) or top ten warmest or wettest (rank 95-104) are shaded.

SSMI MEAN TEMP. ANOMALY IN CELSIUS APRIL 1998
(SNOW COVER WITHIN OR NORTH OF 15% CONTOUR)

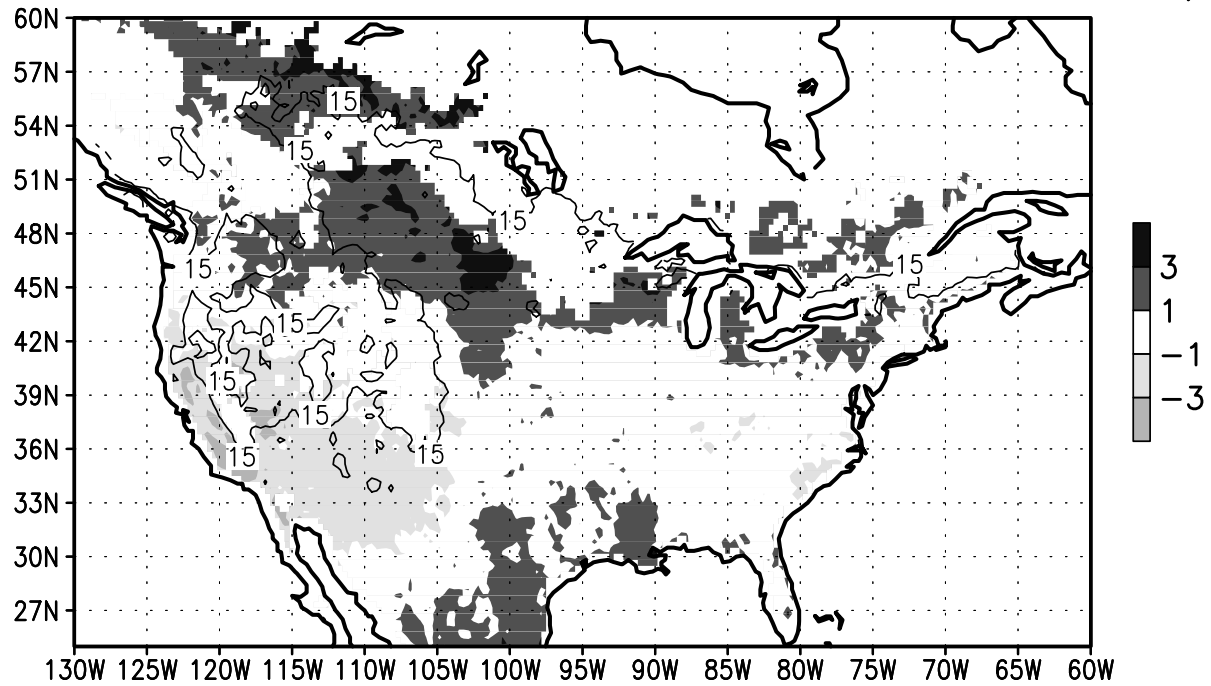


Figure 13

SURFACE WETNESS ANOMALY (%) APRIL 1998

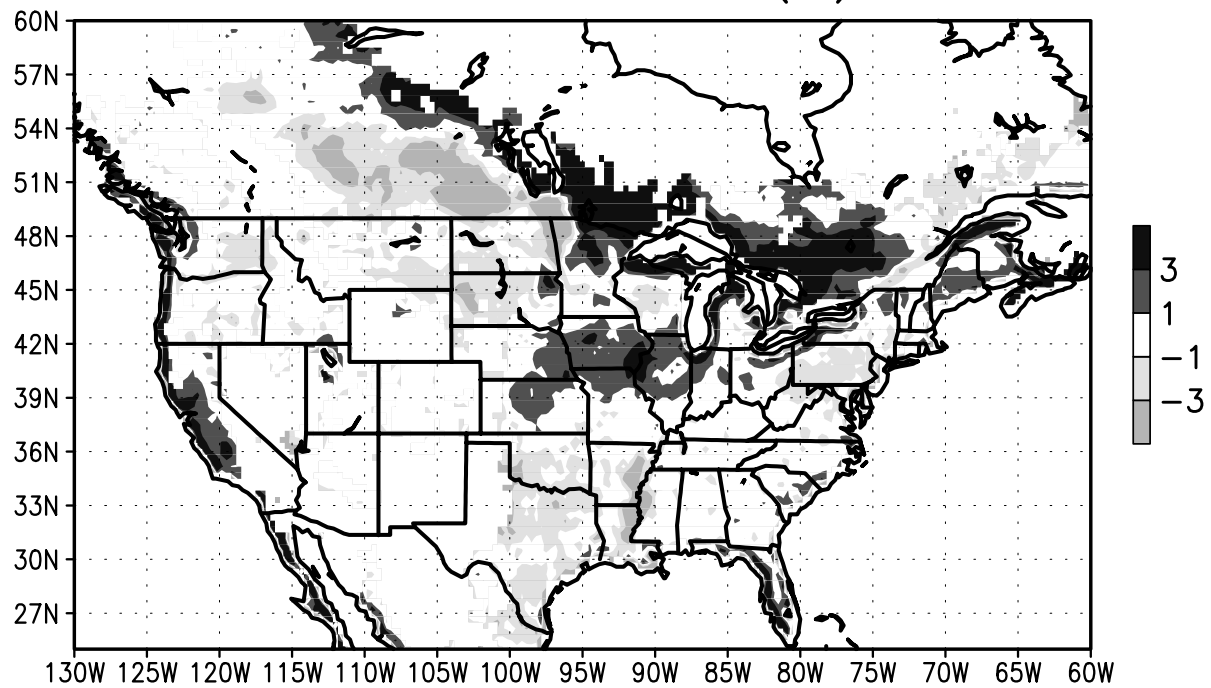


Figure 14

Figure 11A shows, in illustrative map form, the April 1998 temperature rankings for the 48 contiguous states. No state was within the top ten cool portion of the historical distribution while eleven were within the cool third of the historical distribution. Two states ranked within the top ten warm portion of the historical distribution while 19 ranked within the warm third of the distribution.

April 1998 state ranks for precipitation are shown in **Figure 11B**. Four states ranked within the top ten wet portion of the distribution while 13 others ranked within the wet third portion of the distribution. One state ranked within the top ten dry portion of the historical distribution while twelve others ranked within the dry third. ***It should be noted that these April state precipitation ranks are preliminary and should be used with considerable caution due to the high variability of precipitation on a small space and time scale.***

Year-to-date statewide temperature and precipitation ranks are shown in **Figures 12A and 12B**. Twenty-one states ranked within the top ten warm portion of the historical distribution while 17 others ranked within the warm third of the distribution. The year-to-date was the warmest such period on record for Connecticut, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Rhode Island, Vermont, and Wisconsin. The January-April period was the second warmest such period on record for Minnesota, Ohio, and Pennsylvania. No state was within the top ten cool or the cool third of the historical distribution. It was the wettest January-April period on record for Maryland, North Carolina, South Carolina, and Virginia. Twelve other states ranked within the top ten wet portion of the distribution. No state ranked within the dry third of the distribution.

Figure 13 shows the mean monthly temperature anomalies for the month of April 1998. The base period is seven years (1992-98). This experimental product is derived from the Special Sensor Microwave Imager (SSM/I), an instrument flown on a polar orbiting satellite of the defense meteorological satellite program. The anomalies are in degrees Celsius. Below normal temperatures cover the southwestern and southeastern states, where the sub-tropical jet brought persistent cloud cover and above normal rainfall during much of the month. Temperatures were above average over the southern plains, where a ridge of high pressure dominated the region. Other areas of above normal temperature included the northern tier of the U.S. and southern Canada, where fewer outbreaks of cold air allowed the region to experience unseasonable mild conditions. Furthermore, a reduction of Pacific storms across the northwestern states (most of the storm activity was further south) allowed this region to be milder than normal during the month. Due to persistent snow cover in central Canada and the high mountains in western North America, the satellite was unable to identify temperature anomalies in these regions. This area is displayed on the map as being within or north of the 15% contour. Full and anomalous fields for temperature, surface and snow cover for both North America and the globe can be viewed on the web at: <http://www.ncdc.noaa.gov/plwebapps/plsql/ssmimain>.

Figure 14 shows the mean monthly surface wetness anomalies for April 1998. This product is derived from the SSM/I. Values represent the deviation from the climatological average, using a 1992-1998 base period. Surface wetness can originate from numerous sources: rainfall, melting snow cover, river flood plain, wet lands, or irrigated fields. The radiating surface observed by the satellite can be the ground, or in places of dense vegetation, it can be the water in the vegetated canopy itself. These wetness values do not necessarily equate to soil moisture, although in areas of sparse or limited vegetation, there is a strong correspondence. During the month of April, the Canadian plains experienced a premature reduction of snow cover, which translates to above normal surface wetness. Further south near the U.S. border, the surface wetness is below normal since the snow cover that should have melted in April, had already melted in the previous months. An active storm track in the Midwest brought above normal wetness to the region. Much of the above normal rainfall along the southeastern U.S. and eastern seaboard is not evident in the anomaly field, since water on the ground is obscured by dense vegetation. The full and anomalous surface wetness fields can be observed for North America and the globe on the web at: <http://www.ncdc.noaa.gov/plwebapps/plsql/ssmimain>.

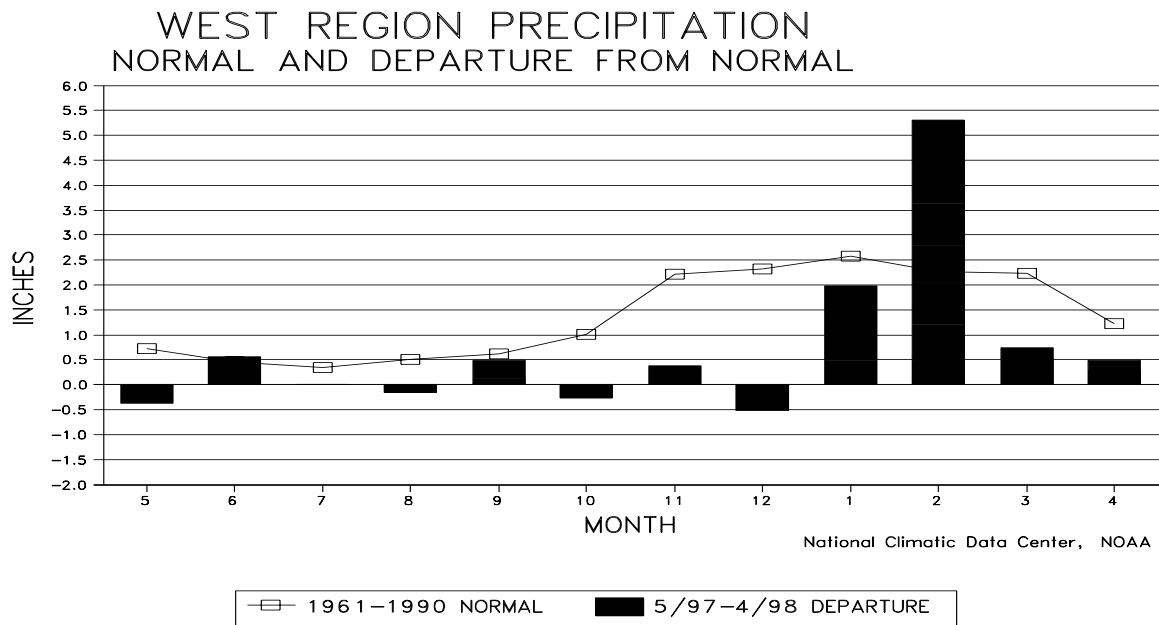


Figure 15: Precipitation for the West Region has been above normal for each of the last four months and for seven of the last twelve months. Past El Nino episodes have provided wetter than normal conditions for this part of the country. The West Region includes California and Nevada.

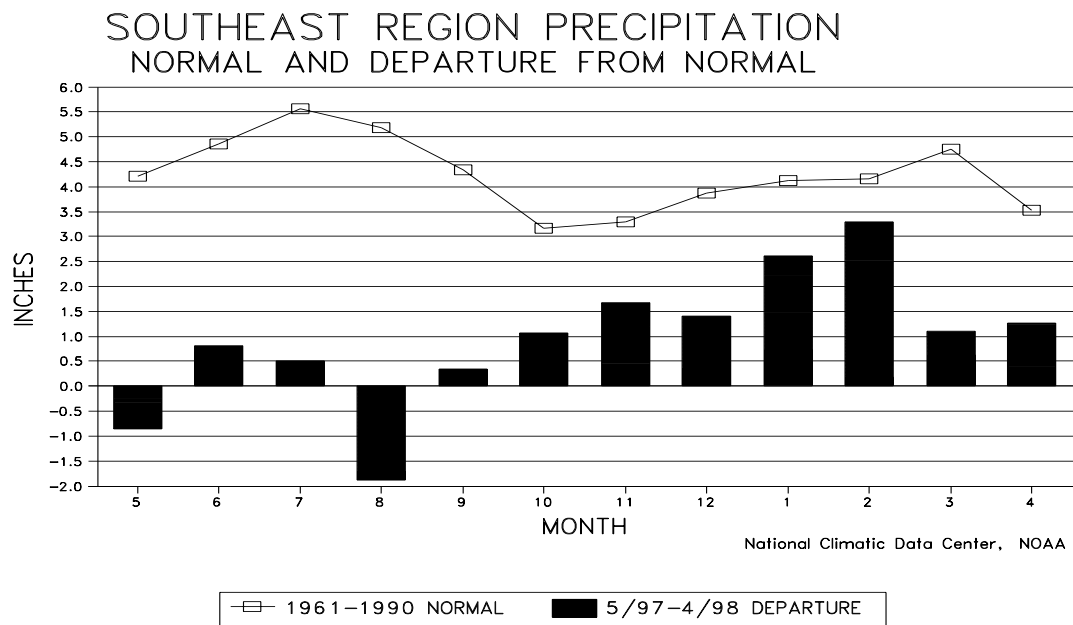


Figure 16: Ten of the last twelve months have been wetter than normal for the Southeast Region including each of the last eight months. The teleconnections and subtropical jets associated with the present El Nino had a direct impact on the above normal precipitation in the Southeast beginning in the Fall and persisting through April. The Southeast Region includes Virginia, North Carolina, South Carolina, Georgia, Alabama, and Florida.